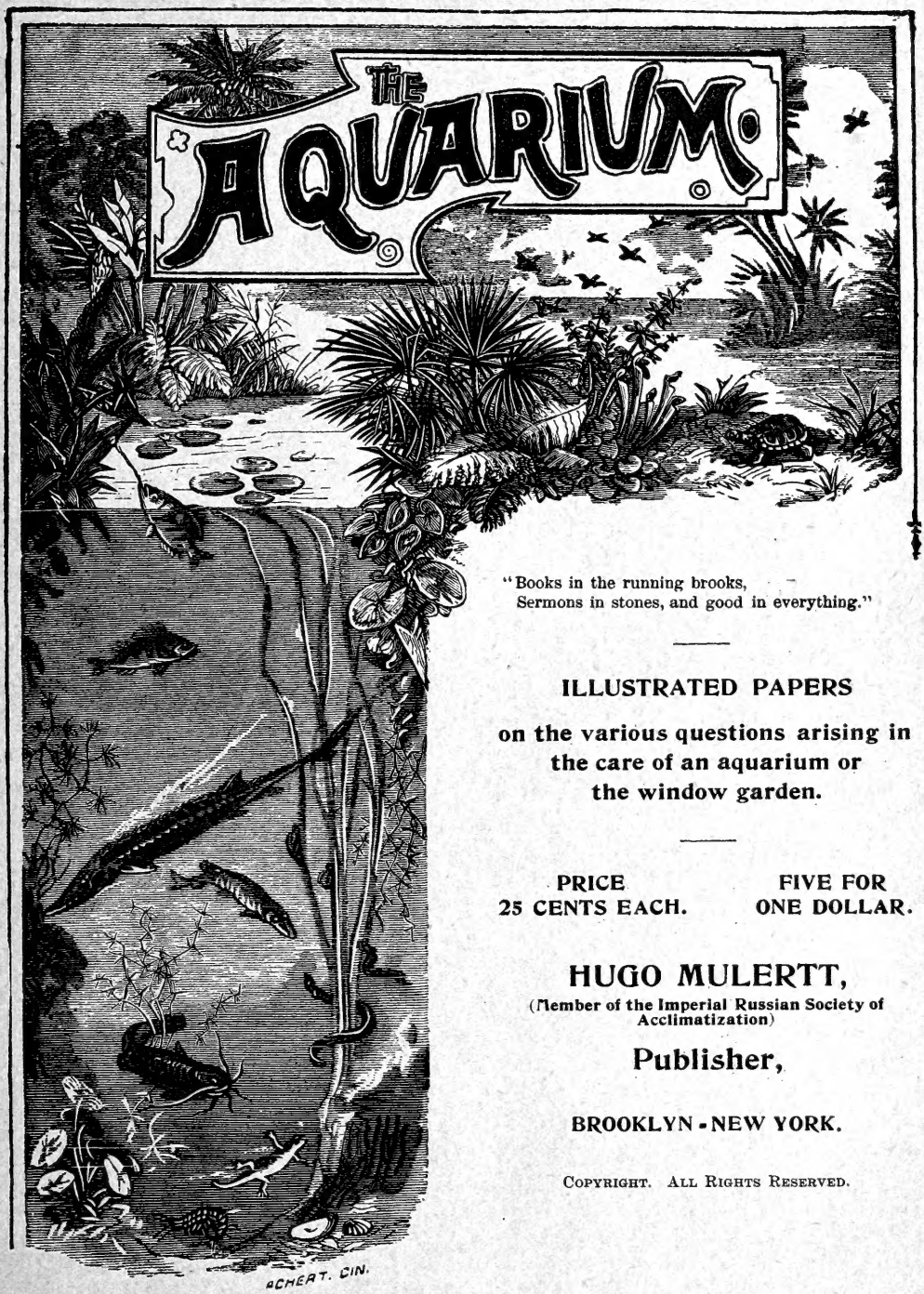

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Sermons in stones, and good in everything."

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IDYL OF A RAMBLER.

BY H. B. SMALL.

When man was banished from the Garden of Eden, he received the dread sentence, that "the ground should be cursed for his sake; and that in sorrow should he eat of it all the days of his life." But we are all aware that this language, though true in its general application, is not to be understood in a literal and exclusive sense. Man was told that the earth should "bring forth thorns and thistles;" but it also produces flowers to gratify, and fruits to nourish him. The Infinite Being has said that the "days of our life shall be marked with sorrow," and they are; but the afflictions to which we are subject are attended with blessed antidotes. Moral sources of enjoyment are given us, as fruits and flowers for the soul, and the teachings of interest should lead us to consider with attention those gifts which enlarge the capacities of the spirit, and call forth wonderment at the mighty workings of all bounteous Nature. For instance, who is insensible to the beauties of the rising or the setting of the summer sun? Who can behold the moonbeams reflected from silent river, lake, or sea, and not feel happy in the sight? None, I believe in early life. But when hardened in the ways of the world, and of man; when the chief end pursued is the accumulation of wealth, acquisition of power, or pursuit of pleasure, then mankind loses sight of the beauties of Nature. Were the inherent love of them cherished by early education, how seldom would it be destroyed or become dormant, as it too often is. But the student of Nature finds in every sphere of existence a means of rational enjoyment, a pleasure so fascinating when grasped at that the mind for the time forgets the ills of life, and the glories of Eden spring up in imagination through the mists of troubles; for in every bank, and woodland, and running stream, in every bird among the boughs and every cloud above his head, stores of interest abound which enable him to forget awhile himself and man, and all the care of life in the inexhaustible beauty and glory of Nature, and of the God who made and controls her.

Let us walk side by side in imagination with a naturalist in his daily ramble; let us blend our mind with his to

receive those impressions which he feels, to share the train of reflection that comes crowding on his mind, as the affinities of objects lead his ideas to wander from the leafiness of the temperate to the exuberant foliage of the torrid zone. We approach a woodland. How inspiriting are the odors that breathe from the upland turf; from the rock-hung flower; from the hoary and solemn pine. Deep, and dark, and still are the shadows of the surrounding trees and bushes. The green leaves seem to infuse into our hearts a portion of their happiness as they "clap their hands in glee," and the joyous birds make melody all around. Here let us pause and gather a single blade of grass and examine for a minute, quietly, its narrow, sword-shaped strip of fluted green. Ruskin says of this, nothing, as it seems there of goodness and beauty. A very little strength, and a very little tallness, and a few delicate long lines meeting in a point; not a perfect point either, but blunt and unfinished; by no means a creditable or apparently much cared for example of Nature's workmanship, made, as it seems, only to be trodden on to-day, and to-morrow to be "cast into the oven." And yet, think of it well; and judge whether of all the gorgeous flowers that beam in summer air, and of all strong and goodly trees, pleasant to the eyes, or yielding fruit; stately palm and pine; strong ash and oak; scented citron or burdened vine, there be any by man so deeply loved, by God so highly graced, as that narrow point of feeble grass. And well does it fulfill its mission. Consider what we owe merely to the meadow grass, to the covering of the dark ground by that glorious enamel, by the companies of those soft and countless and peaceful spears. The fields! Follow forth but for a little time the thoughts of all that we ought to recognize in those words. All spring and summer is in them; the walks by silent paths, the rests in noonday heat; the joy of herds and flocks, the sunlight falling in emerald streaks and soft blue shadows, where else it would have struck upon the dark mould or scorching dust; pastures beside the babbling brooks; soft banks and knolls of hills, thymy slopes of down, overlooked by the blue line of the distant sea; crisp lawns, all dim with early dew, or smooth in evening warmth of sunshine; all these are summed up in the simple words, the fields!

Whatever course our thoughts may take, we must remember there is no plant, however humble, no flower or weed that springeth from the earth, but is an organized and living mystery. The secrets of the abyss are not more inscrutable than the work that is wrought in its hidden germ. The goings on of the heavens are not more incomprehensible than the growth of a simple plant as it waves in the summer breeze. The functions that constitute its growth, flower, and fruit, the organs and affinities by which every part receives the material that answers its purpose, who can unfold or explain them? As the fruit of one year falls the seed of centuries of growth is sown. By the mechanism of nature, the stocking of the earth with every kind of growth, from the oak of a thousand years to the weed of a day, is carried on. The acorn falls in moist earth and is trodden in by man or beast to become an oak in course of years, whose timber may resound to and tremble under the roar of warfare on the ocean; berries are carried by

birds and dropped on ledges of rocks, in any handful of soil that may grow there, to sprout and germinate and grow, and to reproduce in their turn seeds for future growth; winged seeds, such as the thistle, the dandelion, etc., are elevated by the winds till they stop in some favored places; hooked seeds, such as are familiarly called "cleavers" or "burrs," entangled on the dress of the passer-by, or hanging to the hair or fleecy coverings of animals, may be carried miles away and find their resting place even in other lands. Whilst men put seeds into the ground by millions, with due care, Nature plants and sows on a larger scale, surpassing man while he is busy, and going on with her work whilst he is sleeping or making holiday. For every tree that falls, thousands are sown; for every flower that fades, millions more are provided. What we do with pains and care in our flower beds, is done silently all over the continents of our globe. New life is provided before decay begins. How beautifully are the shadows thrown abroad and the fine transparent haze, which is diffused over the valleys and plains. The shadows play all day long at silent games of beauty; everything is double if it stands in light. The tree has an unrevealed and muffled self lying darkly along the ground; the slender stems of flowers, "golden rod," "wayside asters," "meadow daisies" and rare lilies cast forth a dim and tremulous line of shadow that lies long all the morning, shortening till noon, and creeping out again all the afternoon until the sun descends yon western horizon. Meanwhile the clouds drop shadows like anchors, that reach the ground but will not hold; every browsing creature, every flitting bird, every unconscious traveler writes itself along the ground in dim shadow. And, speaking of the clouds, let us pause for a few minutes while we look with admiration at the ever changing variety and beauty, at the gorgeous scenery of summer cloudland, the exquisite variety of tints, the graceful motions and the changing shadows which flit over hill and dale. The finest dyes and most skillful looms can never equal the tapestry with which God decorates our earthly abode. These are pictures shut up in no secluded gallery, to be seen only by the rich, but they are spread alike before the lowly and the lofty, in the city and in the remotest solitudes, where all may drink in their beauty and discern the wisdom and the skill of Him who made them. Even the child, as he gazes dreamily at the tiny white speck floating far away in the blue ether, has his little soul filled with interest; and when he sees dark masses of vapor come rolling up slowly and majestically, fold after fold, from the distant horizon, his imagination will transform those fantastic shapes into gigantic snow-capped mountains, towering peak upon peak, until he almost longs for wings to fly and explore their far-off summits. But how comparatively few, children or adults, ever pause to give themselves a matter of fact explanation of the actual formation of clouds, the unerring laws of their creation or dispersion, or the vast beneficent part they take in the economy of Nature. The question may be asked, why there are on some days clouds, and again on others none? The answer is, there are clouds always, although not always visible, or, to be more correct, the material of which clouds are made is always there; for if the air is warmed by the shooting down of the sun's rays for days

past, it holds in solution, invisible, the vapor it has imbibed. But let that air begin to cool, and it parts with its mass of moisture; in other words, it deposits it in the shape of white vapor, being no longer able to retain it in an invisible form. This delicate little cloud, or mass of white vapor, however, is of very precarious existence. One ray of bright sunshine, the faintest return of heat, would send it back again from a state of visible vapor to invisible moisture. Its outward form would be gone, and although we know that its essence would still subsist, indeed, could never be destroyed, yet its apparent existence would be ended. It would thus vanish like many an infant at its very entrance into life, before accomplishing any specific purpose of its being; but again, like the infant, it is only the outward form which sustains annihilation. But heat is not the only thing by which clouds are affected. Life is ever changing with them as with mortals; they are liable at any moment to be whirled into the most fantastic shapes by every fickle wind that passes. If the temperature of the atmosphere continues to lower, the delicate, gossamer-like vapor (beautifully compared by Lamartine to the world's incense floating upwards to the throne of God) will resolve itself into large masses of rolling clouds, and the mass of vapor, no longer able to poise itself in air, descends to earth in grateful, refreshing showers, and perchance in the bosom of the cloud now passing overhead are liquid treasures sucked up from swamps of Florida to go and shower fertility and wealth on the plains of the far-off west. Winter and summer the "clouds drop fatness," but they have other offices to perform besides those merely of dispensing showers, of producing the rains and of weaving mantles of snow for the protection of our fields. They have other commandments to fulfil which, though less obvious, are not therefore the less benign in their influences, or the less worthy of our notice. They moderate the extremes of heat and cold; they mitigate the climate. They spread themselves out, preventing radiation from the earth, and keeping it warm; at another time they interpose between it and the sun; they screen it from his scorching rays, and protect the tender plants from the heat, the land from drought. Having performed this, they are evaporated and given up to the sunbeam and the winds, to be borne on their wings away to other regions which stand in need of their offices. And here I would say that I know of no subject more fit for profitable thought on the part of the knowledge-seeking student than that afforded by the atmosphere. Of all parts of the physical machinery, of all the contrivances in the mechanism of the universe, the atmosphere, with its uses and adaptations, appears to be the most wonderful, sublime and beautiful. In its construction the perfection of knowledge and wisdom is involved, and to turn to Holy Writ, how appropriately does Job burst forth in laudation of the latter as God's handiwork in the twenty-eighth chapter.

The sighing of the wind as it sways the branches of the forest, which now bend before the summer zephyr like courtiers doing homage, now bend beneath the fury of the storm like strong men in adversity, sounds to our naturalist as angels' whispers in its gentleness, or in its fury as the voice of One mightier than Manoah's son, speaking in anger: "The voice of One who break-

THE PROFESSOR AND THE TEASING NAIADS.
--From the Fliegende Blätter.

eth the Cedars, yea, the Cedars of Lebanon!" But, he will tell you this, nature's music is never still, never silent, though often varied, for each tree has its part; the surging of the oak, the whispering of the elm, the rustling of the beech, the laugh of the birch, the sighing of the willow, the moaning of the hemlock, the dirge of the cypress. The pine alone remains constant to melody throughout the year. Every breeze that touches the pine in any season of the year wakes up myriads of fairy harps which united set the air trembling with the most moving harmony that nature affords, the harp music of nature's orchestra. Even the aspect of the woodland itself, if thick with tangled underbrush, the unexplored, impervious forests of the Amazon rise up to the imagination, or if thick with ferns and grasses, it recalls visions of Australian fern trees and wattles; fern trees, now the only corresponding and connecting link to the fossil plants of the coal formation, beneath whose mighty coverts the saurian monsters roamed, the giants of the earth in those days, monsters extinct and passed away, leaving their epitaph in stone to be deciphered only by the researches of science centuries after their existence.

Should the road lead near, or by a pond, our naturalist shrinks not from the wet and swampy ground surrounding it, for the "Forget me not" is there, with blossom blue as the sky of Heaven, and its golden eye bright as Hope itself; there is the calamus, or sweet-scented flag, the iris, the bullrush, heavy and swaying in the wind, the water-lily, rivaling in its blossom the magnolia of southern climes, and harboring under its broad leaves the pike and the perch, the bass and the pickerel, those favorites of meek Walton's followers. The delicate whites and pinks, and yellows and blues of the aquatic blossoms, how bewitching are they in the sunlight!

Adhering to the pond-weed, or slowly drawing their homes along with them, are visible the water snails, amongst which is conspicuous the Planorbis or Coilshell, a representative left us of the ammonite, one of the most universal fossils of the secondary rocks; shells, whose proportions have dwindled down from their colossal size in days of yore, when their circumference equaled that of a wheel, to that of an ordinary copper coin, contrasting in their diminution the present pigmy race of man with his predecessors.

Here we see the Dragon-Fly disporting on its gauzy wings, itself glittering with blue and green, flashing back the sunshine, now hovering poised above the surface of the pool, as if desirous of telling its kindred larvæ who still remain below, and from one of which it lately sprung, the glorious beauty hereafter waiting them when their transformation takes place; but the watery element defies the advance of insect life, and between them there is a great gulf fixed. Fancy may lead us to picture to ourselves the grub preparatory to bursting his prison house by the water side, and rising on glittering wings into the summer air, promising tidings to his fellows of the state it is about to enter, and the longings of those left behind to hear something of that state, dimly fancied by them, but unknown. We could fancy him returning amidst the transports of his wildest flights, ever and anon, to the precincts of that water world which had once been the only world to him; and thus divided, yet near, parted, yet

united by love, he hovers about the barrier that lies between them, darting over the crystal water in the raptures of his new life.

Let us scoop up a handful of the water from the pond and carefully examine it. Our naturalist will tell us that there is in it a creature with neither arms nor legs, properly so called, but which catches animals more lively than itself and twice its own size, with no eyes, yet loving the sunshine, whose stomach can be turned inside out, apparently, without hurting it, and which, if cut in two, will not die, but each part grow into a perfect creature. To inexperienced eyes it looks like a tiny piece of green sewing silk about a quarter of an inch long and a little untwisted at one end ; this, however, is really a set of delicate limbs placed round the thicker end of the slender body of the little Hydra (for such is the name it goes by). These tentacles, or feelers, float in the water like fairy fishing lines. Little creatures invisible to our unaided sight, that have been frisking around full of life and activity, are seized by them, and, one tentacle after another being wound round its prey, the process of digestion takes place. When we laugh at the idea of two or three hydras growing out of one, if severed, we are told the reason is that the principle of life is diffused equally in all its parts ; that any part can live without the rest, and, like the cutting of a plant having life in itself, it can grow into a perfect creature.

RHEUM COLLINIANUM.

Journeying onward, he tells of another animalcule provided with two hairy wheels upon its head, whirling continually around, producing a strong current towards its mouth, placed between them, carrying in all lesser objects floating near, and, like the rotary wheels of a steamboat, carrying him

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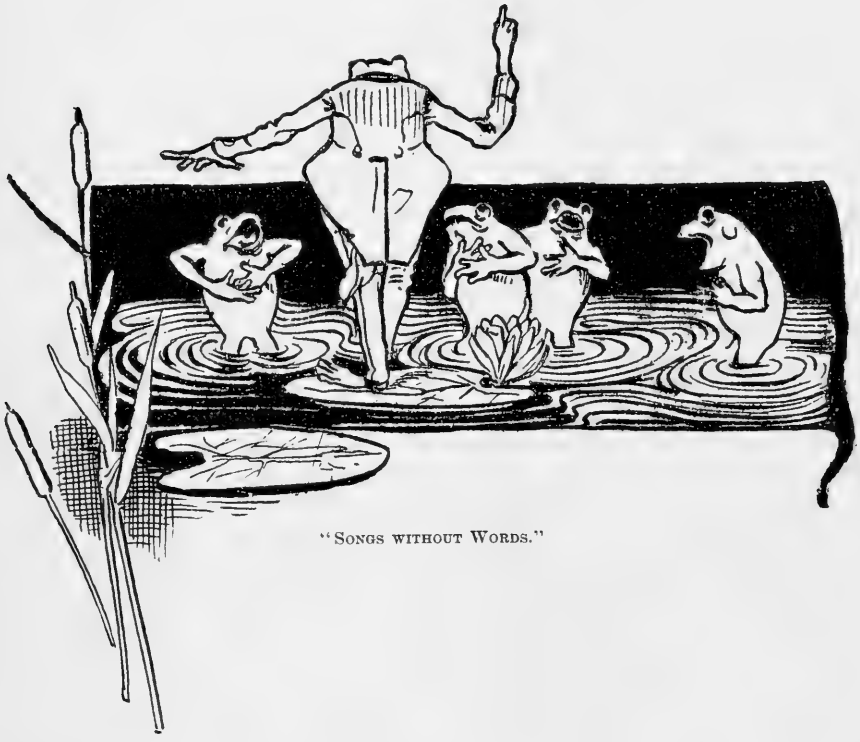
onward, unless, desirous of rest, he grasps with his prehensile tail some friendly water plant. With still greater surprise, we hear that those animalcules each have shells, which in some places during the course of centuries have formed thick layers of fine white earth—so fine that on the shore of a lake near Urnea, in Sweden, the peasants have for many years mixed with their flour this so-called "mountain meal." When we come to think that the vast thicknesses of the chalk cliffs were all formed from the deposition of animalcular exuviæ, surely the mind of man is inadequate to count the myriads of ages through which this process was going on—a process still silently and invisibly working in the depth and darkness of the Atlantic.

Skirting the pond which has thus engrossed our attention, we may see rocks, now rising up precipitously in rugged masses, now sloping quietly to the water's edge, partly clothed with lichens and moss; here covering the stone to the depth of several inches, there clustering around some bare patch of rock. From this we learn how the first accumulation of soil took place, when order was first produced from chaos; soil which year by year increasing from the decomposition of those rudiments of vegetable life, afforded depth and nourishment for plants of a higher order and larger growth, to be in turn succeeded by a more luxuriant vegetation adapted for the support of animal life. As we gaze upon the distant mountain range, what thoughts come crowding to our minds. How solemnly and majestically they raise their rugged peaks to heaven. Now in token of their royalty, crowned with a diadem of clouds, and now with every one of their cliffs gleaming in the sunlight like the pictures of a dream. For ages have they held communion with the mysteries of the midnight sky. The earliest beams of the morning have bathed them in living light, and theirs, too, have been the kisses of departing day. Man and his empire have arisen and decayed, but they have remained unchanged, a perpetual mockery. Upon their summits Time has never claimed dominion. There as of old does the eagle teach her brood to fly, and the wild beast prowls after his prey. There do the waterfalls still leap and shout on their way to the dells below, even as when the tired hunter, centuries ago, bent him to quaff the liquid element. There still does the rank grass rustle in the breeze, and the pine, and the cedar, and the hemlock, take part in the howling of the gale. Upon man alone falls the curse of Time. Nature has never sinned, therefore her glory is immortal. In such scenery we can understand the full meaning of the words: "The hills stand about Jerusalem," and their unchanging aspect whispers into the ear of man that he is but as the moth which flutters in the noontide air. Again the voice of Nature is perpetually singing the saddened strain, "Farewell." It is in the sway of the boughs overhead, and by presentiment when they shall stand bare and stark; the brook ripples already to think how

soon it will be choked by frost into a subterraneaneous gurgle; the mountains are beautifying themselves before they lay off their robes of beauty for a season; even the sea, with its gentle rise and fall, and swelling breast, is telling how its line of beach will soon be driven snow, and its sands no longer warm. What is there in life or in Nature that says farewell more punctually and more sweetly than Nature herself. In spring she sends the early flowers, her children, to foretell her coming, and in autumn, instead of merely disappearing, she summons all her children and all her works to stand in full array and make their tender adieu. The order of departure reverses that of coming. As summer goes she makes this presentation of herself and hers; then she sends the rest away one by one, lingering herself until the last, in our memories of the bygone season.

There are certain things in Nature in which we can discern a human sympathy, a veritable kinship; and if we dismiss these things by referring them to a general fixed law, then the sympathy and the friendship are merely transferred to the law. How persistently and ingeniously she thrusts herself upon our senses, claiming our notice and beseeching our sympathy. There is nothing unsightly of all the unsightly things in the world which she does not try to cover with her fresh growths; she greens over battle and ruin, and wipes off the blackening of fire. We do our best to shut her out in our cities, but it is all in vain. She



"Songs without Words."

sends her little blades of grass to push themselves up beside the flagstones; her ivy climbs the stone churches and castles, hiding the ravages of time, and her trees are the fullest representation of herself—the agent of Him at whose fiat the worlds emerged from chaos:—But, to resume our walk:—Abounding everywhere, and full of interest, are the birds we meet with; in the deep solitudes of the woods the lugubrious cawing of the crow grates upon the ear with hollow voice, which has for ages been an object of evil omen to the credulous and the ignorant; the monotonous sound of the distant woodpecker, "tapping the bark of the hollow beech tree," or making the woods resound with his notes of laughter, takes up the tale; the bluebird, the titmouse, or "chickadee," that happy, restless, easy-going creature, who scorns to leave us for the snows of winter, and picks up a scanty living round the outhouses of the farm; the finch tribe, with their never-ceasing cry, make the very copse alive with their melody; whilst the bobolink on the wing, surveying the grassy plains below him, chants forth a jingling melody of short variable notes, with such confusion and rapidity that it appears as if a whole colony of birds were tuning their notes for some great gathering in Nature's concert hall. And as he is so well-known a bird, I cannot refrain from dwelling on his character a little while. Rivaling the European lark, he is the happiest bird of spring; he comes amidst the pomp and fragrance of the season; his life seems all sunshine, all song. He is to be found in the soft bosoms of the freshest and sweetest meadows, and is most in song when the clover is in bloom. Near by we may see a giant tyrant kingbird, poised on the topmost branch of some veteran tree, who now and then dashes down, assassin like, upon some homebound honey-laden bee, and then with a smack of his bill resume his predatory watch. Over the pool, the swifts, the martens and the swallows seem to vie with each other in acrobatic flight; now skimming the surface of the water, now making with a touch of the wing, a scarcely perceptible ripple.

Besides the birds, the butterflies flicker and flit hither and thither, small and large, white, grave and gay; grasshoppers are noisy beside long stretches of green paths—improvident fellows who sing all through the livelong summer day, unmindful and heedless of coming storm and winter's stern array; and who would think, when looking on the painted butterfly, flashing its gaudy colors in the sunlight, that a few weeks ago it was a groveling worm, an emblem of destruction, a caterpillar. How wondrous the change; how beauteous the transformation. How typical of the spirit of man, who, fettered to the earth in the flesh shall one day emerge from the chrysalis of death and wing its flight to the bowers of Eden.

Bounding through the highest treetops in fearless leaps, light and graceful in form, with bright black eyes, and nimbleness in every movement, the squirrel enlivens the scene, who, after scrutinizing round some moss-grown branch for the disturber of his haunts, hies away from our gaze with a defiant chattering that seems to say—"catch me if you can"—to his nest in some hollow limb, where his booty of acorns, chestnuts or beechnuts is stored up for winter use; and we think, when following his nimble movements, how some of our own species might relieve

our charitable societies of many of their cares if they would only take this provident little fellow as an example. But the lengthening shadows warn us to retrace our steps ere the dark pall of night settles over mountain, valley, tree and stream. The fogs are rising in the meadows, a thin white light of vapor marks with well-defined outline the course of some stream flowing through them. Long before we reach home the curtain is raised that concealed the celestial host; those fires that glow forever and yet are not quenched. There they move as they moved and shone when "the morning stars sang together and the sons of God shouted for joy." It was the same blue-spangled dome on high, above old Rome, when she rioted in all her magnificence and luxury. The "shepherds who watched their flocks by night;" the Magi, whose knowledge of the heavenly host was more enlarged than any others of their time, were warned to study that living page for a light to guide them to the expected Messiah.

The Arab, as he traveled the boundless fields of sand, with his trusty camel—the "ship of the desert—" trusted of old to those burning orbs, for they alone were his chart and his compass. Beyond the grasp of poor, frail man, they light him from the cradle to the sepulchre. Their beams are shed upon his monument, until that, too, is crumbled away, and no token remains to point the spot where his ashes lie. Could a voice be heard from their blue home, doubtless it would speak of a race that has passed from this continent long ere the canvas of Columbus was furled upon these shores—a race that preceded the Indian; a people whose remains are yet among us, but whose history lies deep in oblivion. All on earth has changed; but the glorious heavens yet remain unchanged; sun, moon, planet and satellite, stars and contellations, galaxy and nebulæ, still bear witness to the Power, the Wisdom, and the Love, which placed them of old, and still sustains them where they are.

And now, our ramble over, we feel we have associated ourselves more closely with nature and her Mighty Master—God. The materials with which that Eternal Power writes His name may vary, but the style of the handwriting is the same. And whether in illuminated characters He paints it in the field, or in the starry alphabet bids it flame forth from the face of the firmanent; whether He works in the curious mosaic of a shell, or inscribes it in Hebrew letters on tables of stone; devotion recognizes its Heavenly Father's hand, and admires with reverence His matchless autograph.

In conclusion, let me impress upon the minds of all how everything in nature daily speaks to us in the plainest language, points out to us in its every phase something yet to come—a something unknown, a mighty hereafter. As the swallows homeward fly, their young brood raised, their summer work accomplished, instinct points out to them an unknown land to which to betake themselves from the chills and storms and tempests of winter. Something, we know not what, tells them this is not their rest. As the leaves fall off, withered and sere, having done their share in Nature's mighty laboratory, the tree lies dormant for a time, but only to gain strength to burst forth in fresh beauty at a future time. As the seed is committed to the ground, a dry, shriveled object, to all appearance destitute of life, its future form

as the plant is provided for by all bounteous Nature's hand; as the sun goes down behind the mountains, or is shrouded behind a cloud, its light is hidden but for a time to burst forth again resplendent.

As the river flows, traveling onwards to mix its waters in the unknown depths of the ocean, leaving as it were forever the hills from whence it sprung, it is but to assume the form of vapor to replenish those springs. As the reed bird builds its nest, a home for its little ones yet unborn, an unknown sweet voice of kindness bids it, she knows not why, thus look to the future. Yes, the river is rushing forward, the clouds are hurrying onward, the winds are sweeping past, because here is not their rest. Ask the river, ask the clouds, ask the winds where they go. Another land! Ask the great sun as he descends out of sight where he goes. Another land! And when the appointed time shall come man also must go. Where? To that other land to which these voices of nature have all along directed him—into the presence of nature's God.

FISH PARASITES.

BY A. W. ROBERTS.

The leeches which commonly swim free in the water, and only occasionally attach themselves to the bodies of vertebrate animals to drink themselves full, have their nearest relations in those which attach themselves to the exterior of fishes and crustaceans. While, however, the free swimming leeches have ringed bodies, the parasitic leeches of fish and crabs have soft and smooth bodies, especially in the *Malactobdelles*. In other words, there are leeches which occasionally prey upon warm-blooded animals, and are hardly to be called parasites. Others are to be found only on the skin of cold-blooded vertebrates, and, finally, those of thoroughly parasitic character, which adhere to crabs and soft-skinned animals. The *Pontobdella muricata* is most commonly known as the skate sucker from the fact that it is most frequently found adhering to the different families of the skate or ray family of fishes. This genus of marine leeches can be generally distinguished by the numerous tubercles on the rings of the body, which produce a very curious effect. The prevailing color of the skate sucker is a greenish gray.

These marine leeches are provided with a large and powerful sucking disk, by which they can maintain themselves in a horizontal or perpendicular position; but their most common position, when at rest and attached to inanimate objects, is a spiral, the head being in the centre.

On my return to the aquarium one of the large fresh water tanks, which had been neglected for several months, had become so infested with a small variety of parasitical leech that it was with difficulty the glass front could be kept clear of them. Even the extreme tops of the aquatic plants growing in the tank swarmed with thousands of them constantly extending themselves in their endeavors to catch on (they not being free swimmers) to the tails and fins of the lake dog fish, or the large specimen of fresh water eels contained in the tank. The eels instinctively avoided resting on the floor of the tank or coming in contact with the plants or rock-work sides of the tank, but remained suspended night and day in the open clear mid-water. Still, with all

the precautions taken by the eels, many of them became fringed with hundreds of the leeches. I have seen the eels repeatedly loop themselves so as to bring the head and tail together, in which position they would strip off the leeches with their teeth ; and in so doing they often bit or tore off small pieces of their flesh and fins, so that in course of time (when the wounds did not heal rapidly) they became badly covered with fungus. What with the leeches and fungus the eels had become floating skeletons. To save the few remaining I placed them in the "hospital tank" for treatment. The course of treatment was to rapidly pass them through a bath of warm and very salt water (a nearly saturated solution.) This salt bath I never knew to fail in destroying leeches and fungus, if the fish so treated were not too far gone.

The bottom of the "hospital tank" contained a heavy flooring of Coney Island sand,* in which the eels imbedded themselves as if only too glad to take a rest after their long suspension. At night they were fed to repletion on raw beef. Under this treatment they soon became "solid" and happy.

The tank out of which the eels were taken was then cleared of all the fish remaining, after which a half barrel of quicklime was cast into it, and in one hour's time the lime had done its work, everything living was burnt up, the tank was then drawn off, scrubbed, and washed out, and a heavy bottom of fine sand introduced.

One of the most beautiful tanks I ever had, and of which I was very proud, contained some twenty-five weakfish, thirty kingfish, twenty striped bass, two pilotfish, and several bluefish. They were all in perfect health, high color, and feeding well. In one night all the kingfish died ; the next day the weakfish departed, then the pilots and the blues.

I had nothing in the way of an explanation, as I had never in all my long experience known of fish dying in this unaccountable manner. I examined the dead fish carefully ; both externally and internally they appeared to be in perfect health ; their gills seemed to be unusually healthy for fish kept so long in confinement.

Next to this tank was a tank of plump and healthy blackfish, who were fed as blackfish were never fed before ; and these, too, died in the same unaccountable manner a short time after the other fish.

Next to the blackfish was a tank containing over one hundred spotted codlings, and who were so fat that they seldom swam for more than five minutes at a time without resting half an hour to take breath.

A day or two after the death of the weakfish, kingfish, and blackfish, the codlings began to go. Every few minutes through the day my assistant was scooping out dead fish. Still I could not detect the cause, but I came to the conclusion that when blackfish and codlings (the toughest of all aquarium fish) die, the reason ought to be discovered.

All of these fish, from their first illness, had been fed on the very choicest of marine diet—soft crabs, shrimp, hard and soft clams, and even oysters and scallops. The codlings would churn the surface of the water when fed on soft crab, so keen were their appetites, and yet a minute after they would retire to the bottom of the tank, straighten out and die. I watched the codlings with painful anxiety, for I began to

* Fine white sand.—Ed.

fear that an epidemic was spreading through the entire range of tanks, and that in a few days all the fish would be lost. I had noticed that when a codling began to die it lost its rich colors and took on a sickly brownish white color, and that its death ended in a quivering and spasmodic action, after which it would straighten out and become rigid. These are the exact symptoms of smothering. Yet, how could these fish die of suffocation when I was pouring oxygen into the water so rapidly that the water was of a milky color, and everything was silvery with globules of air ?

Again I determined to make another examination, this time under a microscope, and placing a minute portion of a gill of one of the dead codlings under the glass, I was astonished to find it literally packed solid with very minute marine leeches, every one of which was gorged with blood taken from the gills of the fish. Here was the secret; these thousands of minute parasites had so packed the delicate breathing apparatus of the fish that they had died for want of oxygen, in other words, had smothered.

Evidently these parasites were fast spreading from tank to tank ; the only way to stop this was to lock up the water in the affected tanks, and thus stop the spreading of the parasites through the entire circuit of tanks and into the storage reservoirs. The few codlings that still remained alive were treated the same as the eels, and with like good results. The locked up water was filtered through a large filter, consisting of blankets, sponge, animal charcoal, and fine sand, after which it was allowed to pass into the reservoirs. I afterwards discovered that these parasites had been introduced into the tank through the medium of twenty-five small Eastern lobsters that, in all probability, through long confinement in "cars"* and smack wells,† had become infested with parasites. All these lobsters died shortly after being introduced in the tank.

THE RHUBARB.

(*Rheum.*)

To most people rhubarb is only known in the form of long, sappy stems as sold by our gardeners or grocers to be used in our kitchens. Only few people know that several species of this important plant are, when properly cultivated, objects of great beauty. Especially when rhubarb is grown as a single specimen in good deep soil, on an open grass plot, the enormous leaves and the symmetrical habit of this plant are very decorative. The writer has seen single specimens of this plant on private grounds and in royal and public parks in middle Europe that measured ten feet across, with flower stalks ten to twelve feet high.

The rhubarb, botanically known as *Rheum*, is a native of the far East. *Rheum Emodi* is to-day found in a wild state in the Himalaya mountains, at a height of 9,000 to 16,000 feet above sea level. The great medicinal properties, chiefly contained in the root, caused its extensive cultivation. As a matter of course the most profitable culture is carried on in or near its native home, the climate and properties of the soil being most favorable.

Ten to twelve years are required to grow the root to perfection. It is then as thick as a man's arm. These are

* Perforated wooden boxes kept floating in water in which professional fishermen keep their fish or crabs until wanted to fill orders. —Ed.

† Apartments filled with water aboard of fishing vessels.—Ed.

dug up in the late summer when the plant has gone to rest, split lengthwise, cut into small pieces, strung on strings and dried quickly in the open air and by artificial heat, the product being known as Chinese or India rhubarb (*Radix rhei chinensis v. indici*).

In China, along the borders of Russia, is found the *R. palmatum*. This is extensively cultivated in China and Tartary; it is brought into commerce by way of Russia and known as *R. r. rosici v. moscovitici*. *R. rhaponticum* is a native of Siberia and extensively cultivated there, yielding the drug known as *Radix rhapontici*, much used in veterinary surgery.

In Persia and Syria *R. ribes* is native. It has been cultivated there for many centuries, for the medicinal properties found in the sap of the leaf stems, which is made into the delicious Roob-Ribes and Syrupus petiolum Rhei of commerce.

Many botanical travelers have devoted much of their time, while traveling in Asia, to the study of the cultivation of this important plant. In many localities of Europe *Rheum* is now cultivated with more or less success; in some parts for the purpose of obtaining the high-priced roots of this plant, while in other sections it is extensively grown for the purpose of manufacturing wine and champagne out of the juice of the leaf stems.

The various varieties now cultivated by our gardeners for kitchen and decorative purposes are products of hybridization.

The rhubarb (*Rheum*) is grown from seed. It requires a light, rich soil, about two and a half to three feet deep, with perfect drainage. With a little protection it is perfectly hardy in our climate.

On St. Mary, the largest of the Scilly Islands, nearly one million (900,000) Narcissus bulbs were planted this season, while in Holland only about one-tenth of this number were planted this year.

Damage to Trees by Electric Wires.—While we have had no cases of damaged trees by wires running through the tops, we have had repeated instances of large trees being killed by the wire to hold the pole in place being attached to them. Every instance of fastening such wires to trees has resulted in the loss of the tree sooner or later, unless the wire is removed. The loss is gradual, taking several years. Leakage of underground gas pipes is very destructive to shade trees. I have often seen discussed the question of the effect of electric light on vegetation. There is an electric light on the street at one corner of my nursery, and I have never been able to detect the slightest difference in growth of leaf or wood of plants or trees within the radius of the light or beyond it.—L. B. Rice, Mich., in *Am. Gardening*.

The oldest bouquet of flowers in the world is no doubt the one now on exhibition in the Egyptian museum, at Cairo (Egypt). This was found, together with a piece of floral wreathing and a mummy, in an ancient grave. Although these flowers had been placed there more than 3,000 years ago, the natural colors of some of them partly remain. A species of erica (heather), poppy, chrysanthemums, willow, pomegranate and dielytra can be plainly distinguished among these ancient floral ornaments.

Aquatic Microscopy for Beginners, by Dr. Alfred C. Stokes. $1.50 prepaid by mail. E. F. Bigelow, publisher, Portland, Conn. A very interesting book, well illustrated; it should be in the hands of every aquarist.

For the small sum of one dollar in advance, which pays for a year's subscription to THE AQUARIUM, you are entitled to ask information on any point regarding the aquarium or the window garden. We offer no other premium to our subscribers than that of putting over 25 years of practical experience in these branches at their disposal. Ask as many questions as you please, but please to enclose postage for reply. All questions are answered by mail, and we publish only such in these columns as are of general interest.

DR., Columbus, Ohio.—You cannot develop "several hundred" young goldfish in an aquarium of twenty gallons capacity in the house even if the location of same, an eastern exposure, is very favorable for the development of suitable natural fish food. A tank of such size cannot feed more than about twenty-five young goldfish. A better way of raising baby goldfish for one's aquarium is by using a wooden tub. A whisky or wine barrel sawed in two supplies two such tubs of convenient sizes. Such a tub, after it has been thoroughly soaked with water, is placed in a sunny place in the yard or garden and fitted up with sand, pebbles, and aquatic plants like a regular self-sustaining aquarium, with the exception that no tadpoles are put in, as these would devour the young goldfish. The young fry when about three days from the eggs are placed in this aquarium. The sun acting upon the water, and the mosquitoes which deposit their eggs in it, will supply a large amount of suitable food for the young fish. You need not fear that any of the mosquito larvæ will develop into mosquitoes and molest the neighborhood as long as you have live fish in the tub, as these will devour the larvæ as fast as they appear.

Just what number of young fish such a tub will support cannot be stated with a certainty, as this depends on how sheltered the tub is placed, and in what climate this interesting work is undertaken. The smaller the number of the young fish the more rapid will be their growth. When the fish have attained the size of a cucumber seed artificial feeding should be begun. For this we use our I X L fishfood, powdered, beginning with very small portions once in the morning, gradually increasing the supply and the frequency, until they are fed about every two hours each day. When young fish are raised in an aquarium tank near the window in the house the treatment is the same. By the middle of September the fish will measure about three-quarters to one and a half inch in length, and they may be safely removed to the collection in the parlor aquarium.

L. H. C., O.—Yes, lizards would be useful to keep the aphis from the lotus, but you would not be able to keep these animals at your lily-pond; they would soon find a bush or tree which they would like better and leave the pond. The green lizard is not poisonous, in fact none are. They will try to bite you when you first catch them in the open air, but as soon as they learn to know that they are not harmed they rather enjoy being handled by man.

The best and easiest way to keep aphis from aquatic plants is with the aid of water spiders and water measurers (*Hydrometra*); the latter a lively creature, with a slender body like that of a mosquito, but much larger, is found on any creek or pond near the shore, as is also the water spider. If you will place about four or six of these on your pond they will soon clean your collection.

Frog and toad tadpoles are the best agents to keep the green vegetable growth that enoys your lilies, down. If you keep goldfish in your pond these will also consume a considerable part of it.

Many of the subscriptions to THE AQUARIUM run out with this issue. When renewing, please bear in mind that U. S. postage stamps are taken in payment for same.